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ABSTRACT

Significant reductions in adult illiteracy can be achieved most cost-effectively by focusing more resources on the education of women. These monies contribute not only to women's development but also to the educational achievement of their children. Educated adults have more influence on their children's education; the children become literate adults who, in turn, produce more educable children. Maternal education also has an effect on fertility rates and the mortality and health of children. The contribution of educated mothers to the cognitive and language skills of preschool children gives the children an advantage and continues to affect their educational success. International literacy statistics show that women comprise almost two-thirds of illiterate adults; of the 116 million children under 11 who are unable to attend school, almost two-thirds are girls. Studies showing the effects of women's education on children's literacy argue for greater investment in mothers' education. As greater numbers of women enter the work force and higher levels of literacy are demanded of workers, women's education becomes critical to a literate work force and to economic growth and development. (SK)

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LITERACY LESSONS

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INTERNATIONAL LITERACY YEAR

Teach the mother and reach the child: literacy across generations

by Thomas G. Sticht and Barbara A. McDonald

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Each newborn infant begins life as an illiterate. If the child grows up without acquiring literacy, an adult illiterate appears. The long-term solution to the problem of adult illiteracy is, therefore, one of instilling literacy in each new generation. For instance, even if we were able to make all people over the age of 15 literate to some extent, the new infants and children would be illiterate until they acquired literacy. In combatting illiteracy, then, we must find ways to develop and sustain literacy across generations.

THE INTERGENERATIONAL CYCLES OF LITERACY

Historically, approaches to overcoming problems of adult illiteracy have taken one of two paths; eradication or prevention. On the one hand, attempts to eradicate adult illiteracy have been initiated. Both large-scale national literacy campaigns and smaller-scale literacy programmes have sought to eliminate illiteracy among adults by directly teaching adults to read, write and compute.

On the other hand, with the intention of preventing adult illiteracy, national efforts to provide primary schooling for children have been initiated. However, the results indicate that these programmes have not been an unqualified success. Research has not revealed a convincing connection between early education intervention for poor children and their later cognitive achievement as adults. Basically, governments have discovered a cross-generational relationship of adult education to childhood education. The variable that has remained most influential in providing primary education to children has been parental educational levels. Briefly, it has been discovered that, as a general

trend, the more highly educated the parents, the greater will be the success in providing primary education to children.

> *Essentially, a cycle has been discovered. Adults who are educated have more influence on their children's primary education. Continuing the cycle: if primary education for children is successful, the result will be more highly literate adults who will, in turn, produce more highly educable children with whom the primary schools may work. Educating adults may be the leverage point to start this cycle operating.*

THE NEED FOR LITERATE CULTURES TO 'GROW' LITERATE MINDS

The importance of parents in the education of children reveals the importance of intellectual nourishment. The primary medium for the growth of something is a culture. Just as in agriculture we cultivate a field to improve its productivity in growing plants, we cultivate minds in a literate culture so they will be more productive in problem solving, learning and knowledge development within that culture.

In the field of biology, bacteria and other microorganisms are placed in a special, richly nourishing environment, a substance called agar, to promote rapid growth. Similarly, the growth of literate minds requires an environment rich in literacy.

The home and community as a culture for the growth of literacy.

By and large, literacy will be found in greatest abundance where there are literates who make wide use of their literacy. Thus, it is typical to find that the homes and communities of literates are likely to contain more

literacy artefacts, such as signs, books, magazines, pencils, typewriters, writing paper and so forth, than the homes and communities of non-literates or literates who make only restricted use of their literacy.

Generally speaking, infants born into richly nourishing cultures of literacy, in homes where there are literate parents who use their literacy extensively, tend to grow literate to a large extent even before they enter a special environment for cultivating literacy (primary school).

In the home and community cultures, the newborn illiterate gradually acquires literacy, including knowledge of the *forms* of literacy, such as signs, books, letters and so forth, and the *functional uses* of literacy. Importantly, the emergent literate also acquires a *value* for literacy that is reinforced by parents and others in the literate cultures of the home and community.

The school as a culture for the growth of literates

The German word 'kindergarten' makes the analogy between agriculture and agar cultures as special methods and enriched environments for the growth of plants and organisms, and schools as special nourishing cultures for the rapid growth of children's minds. In particular, schools aim to help children grow literate so that they may make use of and contribute to the development of the literate culture.

Typically, around the world, secular primary schooling begins with instruction in reading, writing and computing. Ordinarily, the aim of primary education is to prepare children with at least the minimum literacy and numeracy skills needed to function well in their community. Additionally, primary education prepares many children with the literacy and numeracy skills needed to progress through secondary education and perhaps through the university level of education.

For the particular nation, investment in primary education is viewed as a means to economic growth and development. A literate and educated workforce is viewed as a necessary resource for success in the international marketplace. The starting point for development of human resources within a culture begins in the family. Families provide the guidance in learning to use the cultural tools which will be reinforced within the culture. Families interpret the culture for their children, they mediate the understanding and use of the cultural tools which include education.

MATERNAL INFLUENCES OF SCHOOLING

For schools to have an effect, they must have healthy students prepared to learn. A very large body of research in both developed and developing nations suggests that a mother's educational level is one of the most important determinants of school participation and achievement. Yet, despite this relationship of mother's education to children's educability, many nations have supported in the past, and many continue to support into the present, policies that relegate girls and women to a secondary place in education.

The failure to focus resources on girls and women is reflected in the international literacy statistics compiled by Unesco. These statistics indicate that women, that is,

It is the thesis of this paper that significant reductions in adult illiteracy can be achieved most cost-effectively by focusing a larger percentage of world educational resources on the education of women. In particular, it is argued that money spent on the education of women who are or are about to become mothers can produce 'double duty' effects. Monies spent on the education of women contribute not only to the development of the women, but also to the educational participation and achievement of their children.

female adults over the age of 15, comprised almost two-thirds of some 900 million adult illiterates in the world in 1985. And of the 116 million of the world's children below the age of 11 who were unable to attend primary school in 1985, almost two-thirds were girls.

Development perspective on the effects of the mother's education on her children's education

Studies are reviewed below that follow the developmental sequence summarized in Table 1. These studies first show the effects of mother's education on fertility rates, then on the pre- and post-natal factors that prepare children for primary education, and then on the factors that help children remain in school and achieve well.

TABLE 1. Some effects of higher levels of mother's education at different phases of child bearing and schooling.

Phase of child bearing/schooling	*Effects of higher levels of mother's education*
Before pregnancy	*Higher economic productivity; better personal health care; lower fertility rates; smaller families*
During pregnancy and at birth	*Better prenatal health care; more full-term births; higher birthweight babies; fewer learning disabilities*
Before going to school	*Better health care; better development of language, cognitive/and literacy skills; better preparation for schoolwork*
During the school years	*Higher participation rates in the schooling process; better management of homework; better advocacy for children's education and negotiation of school/child conflicts; higher academic achievement by children*

Regarding mothers' education and fertility rates, the point is made that mothers' education is important in determining just how many children there will be in the household. The latter, in turn, is related to the preschool cognitive development of children and their subsequent achievement in school.

Given that conception and motherhood have occurred, the next question concerns the pre- and postnatal conditions that permit the birth of healthy children who will survive. Mortality rates and the health of young, preschool children determine how many children will be available to benefit from primary education. Research is cited to suggest that mothers' educational level is a major factor in ensuring high survival rates and healthier children with whom the schools can work.

More highly educated parents not only produce healthier preschool children, they also produce children who are better prepared with knowledge, oral language and literacy skills upon entry into primary schooling. Numerous research studies confirm the importance of preschool parent and child interaction, particularly in activities such as reading together, for the development of cognitive and language skills later useful in achieving in the schools. A brief review of some of this research on 'emergent literacy' is given to demonstrate the role of preschool learning on subsequent school achievement.

Finally, research is summarized regarding the effects of the parents', and especially the mother's, education on children's propensity to stay in school and to achieve at higher levels than children from homes where the parents are less well educated. Some research suggests that the mother's educational level is particularly important for students in the later grades of school, where more difficult assignments may make more demands on the mother's knowledge for help with homework, and where the mother's knowledge of and willingness

to become involved in the schools on behalf of her children may make the difference between her children's school success or failure.

Education and fertility

Results of the 1980 World Fertility Survey indicate that, averaged across twenty developing countries, women's fertility decreased from 6.6 children per woman for those having no school, to 3.5 for those with secondary education. These figures are for all women, whether they are married or not. Comparable figures for married women were 6.4 for those with no education and 4.5 for those with secondary education. Thus, in general, across these developing nations, the more education the female has, the lower the number of children she bears.

The World Bank review of fertility also revealed that, after adjusting for a variety of factors such as spouse's education, occupation and residence (rural, urban), the effect of female education is about three times greater than that of male education on reducing fertility.

In some cases, however, there is an inverted 'U' relationship between female education and fertility rates, with females having primary education having higher fertility rates than those with no education, and then a decrease in rates at higher levels of education. This may occur because with basic education, there may be improved maternal health, thus improving the ability to carry a child to term, and more knowledge about raising healthy children. At higher levels of education, the typical pattern of lowered fertility rates is found.

The number of children born to an individual mother has an influence on cognitive development. It has been shown that the highest cognitive achievement results for those children born first. Relationships of family size to cognitive development in early childhood indicate that, on average, later children tend to develop

less well than first borns. Hence, one consequence of increasing female education may be to reduce fertility, thereby increasing average preschool cognitive ability in families having fewer children.

Maternal education, mortality and health of children

In both developed and developing countries mothers' education is associated with the prenatal and postnatal health of children. In the United States, it has been found that poorly educated mothers are more likely to suffer malnutrition, to smoke, and to abuse alcohol and drugs during pregnancy than more highly educated parents. Closely associated with these adverse activities are low birthweight and premature birth of babies.

Premature, low birthweight babies are almost forty times as likely to die in their first month of life as infants of normal term and weight. Additionally, low birthweight babies tend to have learning disability rates 40 to 45% higher than normal weight babies, and they show high rates of language and literacy development problems.

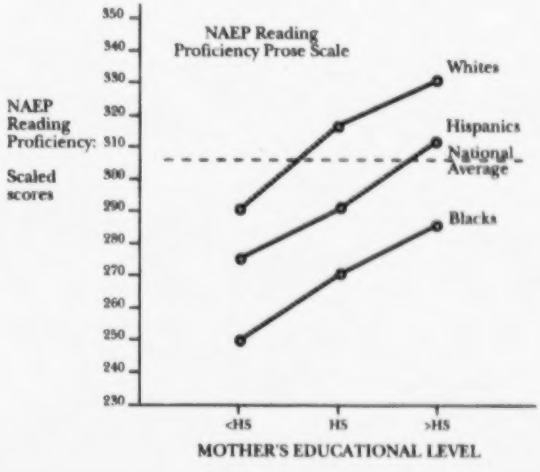
A World Bank review of studies in developing nations in Latin America, the Middle East and Asia have concluded that

- Educated parents, especially mothers, are on average more likely to have healthier and better-educated children. This is true even taking into account income differences.
- The higher the parent's, and especially mother's educational levels, the lower the mortality rate of infants and the better the sanitation, nutrition and health practices.
- More highly educated parents in 31 of 32 countries studied had infants with greater survival rates.

Preschool cognitive development

Studies in both developed and developing countries have shown that parents', and especially mother's, education is related to children's preschool cognitive (including language) development. Preschool cognitive development has strong effects on achievement in academic skills in schools, and these effects may persist into adulthood. This trend is illustrated in data from the United States on its National Assessment of Educational Progress. On these tests, reading scores for children 9, 13 and 17 years of age, and for young adults (18-25 years) show a strong relationship to their mother's educational level. Figure 1 presents data for young adults on the National Assessment of Educational Pro-

FIGURE 1. Performance of young adult Whites, Hispanics and Blacks (21-25 years old) on the National Assessment of Educational Progress (NAEP) in the United States as a function of mother's educational level (less than high school (<HS); high school graduate (HS); and education beyond high school (>HS)).



gress in Reading. For all three ethnic groups, the mother's education is a strong predictor of achievement.

Presumably, the differences among Whites, Hispanics and Blacks in Figure 1 also represent cultural and sub-cultural influences on the effects of schooling, though the exact nature of these influences within the United States is not clear.

Studies in Morocco are consistent with the foregoing in showing that '... families with higher levels of literacy have children who learn to read better.' These findings held true independently of socioeconomic effects, and the mother's literacy level had the strongest single effect on children's reading achievement.

Additional research in the United States indicates that across a wide variety of subjects, such as science, electronics, mathematics, automotive and shop knowledge and others, the mother's education is strongly related to young adult's performance on tests of knowledge in these areas.

However, there is reason to suspect that the relationship of the mother's education to achievement in such school-based topics as mathematics and science may not be the same in some developing nations as it is in developed nations. For instance, in World Bank studies, in lower income, less literate societies, student achievement in mathematics or science was not related to the educational (and hence literacy) level of the mother, over a range of from no education to more than 15 years. In higher income, more highly literate nations, the mother's educational (literacy) level contributed significantly to achievement in mathematics and science. Thus, whether or not the mother's educational level will influence school achievement in these subjects may depend upon whether or not the family is living in a more or less literate culture. This is very likely, because knowledge is best developed when it is reinforced and valued in the culture.

12 *Preschool literacy development.*

A large body of research in both developed and developing nations has indicated that the parents', and especially the mother's, education has a strong influence on whether or not children will have preschool experiences in literacy activities (scribbling, writing, being read to, reading picture books, discussing content).

Further research indicates that children from more highly educated backgrounds enter school with higher levels of oral language skills. These children go on to become the higher level reader in grade school.

Working in Brazil with a sample of forty-two mothers having educational levels from illiterate (27%) to incomplete college education (2.5%), with a median of 2.6 years of education, Terezinha Carraher reported, 'We saw in the case of poor Brazilian children that very few of them may have gone to school with some personal meaning for literacy, since very few mothers read to their children'. On the other hand, preschool 'children whose mothers reported reading stories or letters to them were significantly more likely to succeed than to fail in school'.

In studies of 'Chicano' (Hispanic) families in the United States, Luis Laosa reported 'The children of the more highly schooled Chicano mothers (i.e. generally the Chicano mothers who read more frequently to their children) were more likely to have acquired some measure of literacy before starting kindergarten than were the children of the lower-schooling Chicano mothers (i.e. generally the Chicano mothers who read less frequently to their children)'. Indeed, for mothers with six or fewer years of education, only some 12% of their children learned to read or write before kindergarten, while for mothers with seven to ten and eleven to fourteen years of education, these percentages were around 24 and 40, respectively.

A MOTHER'S CONTRIBUTIONS TO HER CHILDREN'S SUCCESS DURING THE SCHOOL YEARS

The work of the educated mother to develop the cognitive and language skills of preschool children provides an advantage to children upon entry into school. But the influence of parents', and especially the mother's educational level does not end there. In fact, a well-educated mother is a form of continuous support for her children's educational success.

More highly educated parents know more about the schools and the schooling process, and help their children negotiate the many demands of schools. For instance, in one sociological study on the transition from middle school to high school in the United States, it was found that mothers who had at least a college education knew more about their child's school performance, had more contact with the teachers, and were more likely to take action to manage their children's academic achievement.

In additional research, again in the United States, Concha Delgato-Gaitan found that skills of school management could be taught to parents. In this work, Hispanic parents who received education regarding the schools and how they work acquired skills to participate in their children's education. As a consequence, their second grade children read at a higher level and received higher grades than did children whose parents had not received education in the schooling experience. The parents educated in the ways of the schools spent more time reading storybooks to their children and they had frequent contact with teachers regarding homework assignments and other schooling matters.

INVESTING IN THE EDUCATION OF WOMEN

As summarized in Table 1, the available research supports the conclusion that the mother's educational level exerts a strong, positive influence on family size, health and the achievement of her children in school. Additional research by the World Bank indicates that in Egypt and Thailand, a mother's educational level is positively related to higher aspirations for and participation in education by her daughters. In these studies, the mother's aspirations for her daughters' education exceeded the aspirations of the fathers!

The finding that mother's education may lead to higher aspirations for and education of girls is significant because of recent research on education, gender and economic development. This cross-national research in ninety-six countries 'found clear evidence that in less-developed countries, especially some of the poorest, educational expansion among school-age girls at the primary level has a stronger effect on long-term economic prosperity than does educational expansion among school-age boys.'

All of these positive effects of women's education offer compelling arguments for greatly expanding efforts to include women in literacy and adult education programs. More than for men, investments in literacy education for women bring multiple returns.

The need for greater investment in women's education

If the situation in industrialized nations provides a glimpse of the future for developing nations, then we may expect that (1) greater numbers of women will enter the workforce and (2) higher levels of literacy will

be demanded as the nature of the workplace moves toward that of industrialized nations.

This suggests that more investment needs to be made in the education of girls and women who have not attended or not achieved well in school and who are about to become parents, so that they can acquire literacy skills needed for work and can then also transfer their education to their children.

In many countries, including the United States, the effort toward eradicating illiteracy has taken the direction of providing preschool education to children or poorly educated parents, while leaving the latter to make do with much less by way of resources for literacy and adult education.

> *It seems that a more cost-beneficial approach to early childhood education would be to shift more of the billions of dollars now spent exclusively on attempts to overcome the limitations of the family in the schools to include education for both parents and children, with an emphasis on mothers' education. If the correlations between mothers' education and children's achievement imply a cause and effect, then it seems likely that investments in mothers' (or mothers'-to-be) education might produce 'double duty dollars' – both the adults and their children would benefit. Additionally, the workplace would benefit by having a more literate, highly educated workforce immediately available.*

To make progress toward educating women in order to educate children better, several other changes must take place as well. As noted by Unesco and others, if women and girls are to participate in literacy programmes, it will be necessary to combat the social and cultural prejudice with regard to the education of women. It will be necessary to explain the importance of educating women, both to women themselves and to the community as a whole, and gain community support for it; because women cannot participate in literacy programmes if they are required to completely

maintain their other roles. They will have to be given free time in order to participate, they will have to be given less difficult working conditions. They will need childcare for their children. Through appropriate functional literacy programmes, women should be provided with training that will help them increase their incomes and meet their basic needs, and enable them to participate actively and fully in the cultural life of the community.

In short, for getting the most from scarce educational resources, a much larger commitment worldwide to the education of girls and women would seem called for. With the money spent in educating women, we could:

Teach the mother and reach the child.

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